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EXAMINER	
BLACKMAN, ROCHELLE ANN J	
ART UNIT	PAPER NUMBER
2851	

DATE MAILED: 07/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/732,957	HAYASHI, KOHTARO	
	Examiner	Art Unit	
	Rochelle Blackman	2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/11/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claims 6, 7, 13, and 14 are objected to because of the following informalities: On line 5 of claims 6 and 7, "flame" should be - -frame- -. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1-4 and 6-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shigematsu et al., U.S. Patent Application Publication No. 2003/0007138.

Regarding claims 1-4 and 6-8, Shigematsu discloses a "projection optical system for projecting an image displayed onto a predetermined projection surface"(see Fig. 15) comprising: a "front lens unit situated on the projection surface side"(see L43, L44, and L51-L55 of Fig. 15-17); a "rear lens unit situated on the display surface side"(see L11, L12, and L21-L23 of Fig. 15-17); a "first decentering lens unit situated between the front lens unit and the rear lens unit, movable in a direction vertical to an optical axis of the projection optical system"(see L24 Fig. 15-17); a "second decentered lens unit situated between the front lens unit and the rear lens unit, movable in a direction vertical to an

optical axis of the projection optical system and substantially vertical to a direction where the first decentering lens unit is moved"(see L31 of Fig. 15-17); and a "driving mechanism for reciprocating the first and second decentering lens units in directions vertical to the optical axis"(see 401 of Fig. 15-17); "wherein the first decentering lens unit has positive optical power"(see L24 of Fig. 15-17), and the "second decentering lens unit has negative optical power"(see L31 of Fig. 15-17); "wherein the first decentering lens unit is a plane-convex lens element, the second decentering lens unit is a plane-concave lens element, and curved surfaces thereof are opposed to each other"(see L24 and L31 of Fig. 15-17); an "aperture stop situated between the front and rear lens units, and wherein the first and second decentering lens units are situated at the vicinity of the aperture stop"(see AS of Fig. 15-17); "wherein the first and second decentering lens units are supported by lens frames, individually"(see 310 of Fig. 12B - although lens frames for "first and second lens units" L24 and L31 are not shown in Figs. 15-17, "first and second lens units" L24 and L31 are considered to have the same lens frames as "lens frame" 310 in Fig. 12A) and wherein the driving mechanism includes: a "supporter for supporting the lens frame so as to be rotatable"(see 311a-b and 315-317 of Figs. 12A-B and 13, although not shown in Figs. 15-17, the supporter for the "lens frames" of L24 and L31 are considered to be same as "supporter" 311a-b and 315-317 in Figs. 12A-B and 13); and an "actuator for rotating the lens fame about the supporter, disposed substantially on the opposite side of the supporter with respect to a center of the decentering lens unit"(see 401 of Figs. 15-17); "wherein the first and second lens units are supported by lens frames, individually"(see 310 of Fig. 12B -

although lens frames for "first and second lens units" L24 and L31 are not shown in Figs. 15-17, "first and second lens units" L24 and L31 are considered to have the same lens frames as "lens frame" 310 in Fig. 12A), and wherein the driving mechanism includes: a "guide shaft for guiding a movement of the decentering lens unit, fitted in a through hole provided in the lens frame"(see 311a-b and 315-317 of Figs. 12A-B and 13, although not shown in Figs. 15-17, the guide shaft for L24 and L31 are considered to be same as "guide shaft" 311a-b and 315-317 in Figs. 12A-B and 13); an "actuator for linearly reciprocating the lens frame along the guide shaft, disposed on the opposite side of the guide shaft with respect to a center of the decentering lens unit"(see 401 of Figs. 15-17); "wherein the first and second decentering lens units and the driving mechanism are integrated into a single optical unit"(see L24, L31, and 401 of Figs. 15-17).

Regarding claims 9-22, Shigematsu discloses a "projection optical system for projecting an image displayed on a predetermined display surface onto a predetermined projection surface"(see Fig. 15-17) comprising: a "first decentering lens unit movable in a direction vertical to an optical axis of the projection optical system"(see L24 Fig. 15-17); a "second decentering lens unit movable in a direction vertical to an optical axis of the projection optical system and substantially vertical to a direction where the fist lens is moved"(see L31 of Fig. 15-17); and a "driving mechanism for reciprocating the first and second decentering lens units in directions vertical to the optical axis, wherein a pair of the first and second decentering lens units is exposed on a most end part of the display side of the projection optical system"(see 401 of Fig. 15-17); wherein the "first

decentering lens unit has positive optical power"(see L24 of Fig. 15-17), and the "second decentering lens unit has negative optical power"(see L31 of Fig. 15-17); "wherein the first decentering lens unit is a plane-convex lens element, the second decentering lens unit is a plane-concave lens element, and curved surfaces thereof are opposed to each other"(see L24 and L31 of Fig. 15-17); wherein the projection optical system is a zoom optical system whose focal length is variable"(see L23, L25, L26, L33, L35, and 400 of Figs. 15-17); "wherein the first and second decentering lens units are supported by lens frames, individually"(see 310 of Fig. 12B - although lens frames for "first and second lens units" L24 and L31 are not shown in Figs. 15-17, "first and second lens units" L24 and L31 are considered to have the same lens frames as "lens frame" 310 in Fig. 12A), and wherein the driving mechanism includes: a "supporter for supporting the lens frame so as to be rotatable"(see 311a-b and 315-317 of Figs. 12A-B and 13, although not shown in Figs. 15-17, the supporter for the "lens frames" of L24 and L31 are considered to be same as "supporter" 311a-b and 315-317 in Figs. 12A-B and 13); and an "actuator for rotating the lens fame about the supporter, disposed substantially on the opposite side of the supporter with respect to a center of the decentering lens unit"(see 401 of Figs. 15-17); "wherein the first and second lens units are supported by lens frames, individually"(see 310 of Fig. 12B - although lens frames for "first and second lens units" L24 and L31 are not shown in Figs. 15-17, "first and second lens units" L24 and L31 are considered to have the same lens frames as "lens frame" 310 in Fig. 12A), and wherein the driving mechanism includes: a "guide shaft for guiding a movement of the decentering lens unit, fitted in a through hole provided in the

lens frame"(see 311a-b and 315-317 of Figs. 12A-B and 13, although not shown in Figs. 15-17, the guide shaft for L24 and L31 are considered to be same as "guide shaft" 311a-b and 315-317 in Figs. 12A-B and 13); an "actuator for linearly reciprocating the lens game along the guide shaft, disposed on the opposite side of the guide shaft with respect to a center of the decentering lens unit"(see 401 of Figs. 15-17); "wherein the first and second decentering lens units and the driving mechanism are integrated into a single unit"(see L24, L31, and 401 of Figs. 15-17); a "light valve actuated on the display surface for displaying an image, having a plurality of pixels arranged with a predetermined pitch, each pixel displaying one point of the image, wherein the image displayed on pixels are changed according to a positions of the first and second decentering lens units"(see A(R) of Figs. 15-17); wherein the "first decentering lens unit has positive optical power"(see L24 of Fig. 15-17), and the "second decentering lens unit has negative optical power"(see L31 of Fig. 15-17); "wherein the first decentering lens unit is a plane-convex lens element, the second decentering lens unit is a plane-concave lens element, and curved surfaces thereof are opposed to each other"(see L24 and L31 of Fig. 15-17); "wherein the projection optical system is a zoom optical system whose focal length is variable"(see L23, L25, L26, L33, L35, and 400 of Figs. 15-17); "wherein the pixel of the light valve is projected onto the projection surface by the projection optical system as an image element, and wherein movements of the first and second decentering lens units cause an image shift of 0.3 to 1 times of an pitch of the image element in a projection image on the projection surface"(see A(R), L24, L31 and 401 of Figs. 15-17) ; "wherein a locus of an image shifting on the projection surface by

movements of the first and second decentering lens units is a circle; wherein a locus of an image shifting on the projection surface by movements of the first and second decentering lens units is a quadrangle"(see A(R), B(W), L24, L31, and 401 of Figs. 15-17).

Shigematsu does not appear to disclose that the following conditions are fulfilled:

"$0.01 \leq |FR/FD1| \leq 0.2$, and

$0.01 \leq |FR/FDZ| \leq 0.2$,

where FDI represents a focal length of the first decentering lens unit, FD2 represents a focal length of the second decentering lens unit, and FR represents a focal length of the rear lens unit"; and

"$0.01 \leq |LB/FD1| \leq 0.2$, and

$0.01 \leq |LB/FDZ| \leq 0.2$,

where FD1 represents a focal length of the first decentering lens unit, FD2 represents a focal length of the second decentering lens unit, and LB represents an air distance equivalent of a back focal distance of a part of the projection optical system except the first and second decentering lens units".

It would have been obvious to one of ordinary skill in the art at the time the invention was made to configure the projection system of the Shigematsu reference to fulfill the conditions above, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routing skill in the art. In re Aller, 105 USPQ 233.

2. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shigematsu et al., U.S. Patent Application Publication No. 2003/0007138 in view of Iizuka, U.S. Patent No. 6,113,240.

Shigematsu discloses three positive lenses L23, which is part of the "rear lens unit", L25, and L26 and two negative lenses L33 and L35 adjusted in the Z -axis direction (direction of the optical axis AX) by the adjustment means 400, but does not appear to discloses a zoom optical system having the movable lens unit included "only in the front lens unit".

Iizuka discloses a condenser lens 4 and projection lens 6, which is a front lens and may be a zoom lens in order to change the area size of the projected image (see 6 of FIG. 1, col. 3, lines 22-25, and col. 4, lines 30-32).

It would have been obvious to one ordinary skill in the art a the time the invention was made to include the zoom lens only in the "front lens unit" of the Shigematsu reference, as taught by Iizuka in order to change the area size of the projected image.

3. Claims 9, 12-15, 16/9, and 19/9-22/9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iizuka, U.S. Patent No. 6,113,240.

Iizuka discloses a "projection optical system for projecting an image displayed on a predetermined display surface onto a predetermined projection surface"(see 1 of FIG. 1 and see FIGS. 3 and 4) comprising: a "first decentering lens unit movable in a direction vertical to an optical axis of the projection optical system"(see 4 of FIGS. 1-4); a "second decentering lens unit movable in a direction vertical to an optical axis of the

projection optical system and substantially vertical to a direction where the fist lens is moved"(see 6 of FIGS. 1-4); and a "driving mechanism for reciprocating the first and second decentering lens units in directions vertical to the optical axis, wherein a pair of the first and second decentering lens units is exposed on a most end part of the display side of the projection optical system"(see 10, 20, 31-34, and 40 of FIGS. 1 and 2); "wherein the projection optical system is a zoom optical system whose focal length is variable"(see 6 of FIGS. 1-4 and col. 4, lines 30-32); "wherein the first and second decentering lens units are supported by lens fames, individually"(see 11 and 14-16 of FIG. 2 and col. 3, lines 42-54), and wherein the driving mechanism includes: a "supporter for supporting the lens frame so as to be rotatable"(see 15a, 15b, 16a, and 16b of FIG. 2); and an "actuator for rotating the lens fame about the supporter, disposed substantially on the opposite side of the supporter with respect to a center of the decentering lens unit"(see 12 and 13 of FIG. 2); "wherein the first and second lens units are supported by lens fames, individually"(see 11 and 14-16 of FIGS. 2), and wherein the driving mechanism includes: a "guide shaft for guiding a movement of the decentering lens unit, fitted in a through hole provided in the lens fame"(see 15a, 15b, 16a, and 16b of FIG. 2); an "actuator for linearly reciprocating the lens game along the guide shaft, disposed on the opposite side of the guide shaft with respect to a center of the decentering lens unit"(see 12 and 13 of FIG. 2); "wherein the first and second decentering lens units and the driving mechanism are integrated into a single optical unit"(see col. 7, lines 26-32); an "image projection apparatus"(see 1 and 5 of FIG. 1) comprising: a "projection optical system"(see 1 of FIG. 1 and see FIGS. 3 and 4) and a

"light valve actuated on the display surface for displaying an image, having a plurality of pixels arranged with a predetermined pitch, each pixel displaying one point of the image, wherein the image displayed on pixels are changed according to a positions of the first and second decentering lens units"(see 3 of FIGS. 1, 3, and 4); "wherein the projection optical system is a zoom optical system whose focal length is variable"(see 6 of FIGS. 1-4 and col. 4, lines 30-32); "wherein the pixel of the light valve is projected onto the projection surface by the projection optical system as an image element, and wherein movements of the first and second decentering lens units cause an image shift of 0.3 to 1 times of an pitch of the image element in a projection image on the projection surface; wherein a locus of an image shifting on the projection surface by movements of the first and second decentering lens units is a circle; wherein a locus of an image shifting on the projection surface by movements of the fist and second decentering lens units is a quadrangle"(see "light valve" 3, R1-R4, and light rays in FIGS. 1, 3, and 4).

Iizuka does not appear to disclose that the following conditions are fulfilled:

$$0.01 \leq |LB/FD1| \leq 0.2, \text{ and}$$

$$0.01 \leq |LB/FDZ| \leq 0.2,$$

where FD1 represents a focal length of the first decentering lens unit, FD2 represents a focal length of the second decentering lens unit, and LB represents an air distance equivalent of a back focal distance of a part of the projection optical system except the first and second decentering lens units".

It would have been obvious to one of ordinary skill in the art at the time the invention was made to configure the projection system of the Iizuka reference to fulfill

the conditions above, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routing skill in the art. In re Aller, 105 USPQ 233.

4. Claims 10, 11, 17, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iizuka, U.S. Patent No. 6,113,240 in view of Fujibayashi, U.S. Patent No. 5,980,045.

Iizuka discloses the claimed invention except for the first decentering lens unit having "positive optical power", the second decentering lens unit having "negative optical power", the first decentering lens unit being a "plane-convex lens element", and the second decentering lens unit being a "plane-concave lens element".

Fujibayashi discloses an optical system with a plane-convex lens 3H having positive refractive power and a plane-concave lens 3L having negative refractive power movable in a direction vertical to the optical axis in order to make magnification adjustment according to the magnification of the projection lens 7M (see FIG. 4B and see col. 2, lines 40-45).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the Iizuka reference with a plane-convex lens 3H having positive refractive power and a plane-concave lens 3L having negative refractive power movable in a direction vertical to the optical axis, as taught by Fujibayashi in order to make magnification adjustment according to the magnification of the projection lens.

5. Claims 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujibayashi, U.S. Patent No. 5,980,045.

Fujibayashi discloses a "projection optical system for projecting an image displayed on a predetermined display surface onto a predetermined projection surface"(see FIGS. 1-8) comprising: a "first decentering lens unit movable in a direction vertical to an optical axis of the projection optical system"(see 3H of FIG. 4B); a "second decentering lens unit movable in a direction vertical to an optical axis of the projection optical system and substantially vertical to a direction where the fist lens is moved"(see 3L of FIG. 4B); and a "driving mechanism for reciprocating the first and second decentering lens units in directions vertical to the optical axis, wherein a pair of the first and second decentering lens units is exposed on a most end part of the display side of the projection optical system"(see 16 and 17 of FIG. 1); "wherein the first decentering lens unit has positive optical power"(see 3H of FIG. 4B), and the "second decentering lens unit has negative optical power"(see 3L of FIG. 4B); "wherein the first decentering lens unit is a plane-convex lens element"(see 3H of FIG. 4B), "the second decentering lens unit is a plane-concave lens element, and curved surfaces thereof are opposed to each other"(see 3L of FIG. 4B); "wherein the projection optical system is a zoom optical system whose focal length is variable"(see 5 of FIG. 4B).

Fujibayashi does not appear to disclose that the following conditions are fulfilled:

"$0.01 \leq |LB/FD| \leq 0.2$, and

$0.01 \leq |LB/FDZ| \leq 0.2$,

where FD1 represents a focal length of the first decentering lens unit, FD2 represents a focal length of the second decentering lens unit, and LB represents an air distance equivalent of a back focal distance of a part of the projection optical system except the first and second decentering lens units".

It would have been obvious to one of ordinary skill in the art at the time the invention was made to configure the projection system of the Fujibayashi reference to fulfill the conditions above, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routing skill in the art. In re Aller, 105 USPQ 233.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rochelle Blackman whose telephone number is (571) 272-2113. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on (571) 272-2258. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RB

David Gray
Primary Examiner